

ETS Exposure in the Workplace in the US  
2001-2002

<1>

Authors

Gordon SM. Wallace LA. Brinkman MC. Callahan PJ. Kenny DV.

Title

Volatile organic compounds as breath biomarkers for active and passive smoking

Source

Environmental Health Perspectives. 110(7):689-698, 2002 Jul.

Abstract

We used real-time breath measurement technology to investigate the suitability of some volatile organic compounds (VOCs) as breath biomarkers for active and passive smoking and to measure actual exposures and resulting breath concentrations for persons exposed to tobacco smoke. Experiments were conducted with five smoker/nonsmoker pairs. The target VOCs included benzene, 1,3-butadiene, and the cigarette smoke biomarker 25-dimethylfuran. This study includes what we believe to be the first measurements of 1,3-butadiene in smokers' and nonsmokers' breath. The 1,3-butadiene and 2,5-dimethylfuran peak levels in the smokers' breath were similar (360 and 3176  $\mu\text{g}/\text{m}^3$ , respectively); the average benzene peak level was 522  $\mu\text{g}/\text{m}^3$ . We found higher peak values of the target chemicals and shorter residence times in the body than previously reported, probably because of the improved time resolution made possible by the continuous breath measurement method. The real-time breath analyzer also showed the presence of the chemicals after exposure in the breath of the nonsmokers, but at greatly reduced levels. Single breath samples collected in evacuated canisters and analyzed independently with gas chromatography/mass spectrometry confirmed the presence of the target compounds in the postexposure breath of the nonsmokers but indicated that there was some contamination of the breath analyzer measurements. This was likely caused by desorption of organics from condensed tar in the analyzer tubing and on the quartz fiber filter used to remove particles. We used the decay data from the smokers to estimate residence times for the target chemicals. A two-compartment exponential model generally gave a better fit to the experimental decay data from the smokers than a single-compartment model. Residence times for benzene, 1,3-butadiene, and 2,5-dimethylfuran ranged from 0.5 (1,3-butadiene) to 0.9 min (benzene) for  $\tau_1$ , and were essentially constant (14 min) for  $\tau_2$ . These findings will be useful in models of environmental tobacco smoke exposure and risk.

[References: 66]

Publication Type

Article

PM3006508976

Source: <https://www.industrydocuments.ucsf.edu/docs/jghj0001>

<2>

Authors

Wortley PM. Caraballo RS. Pederson LL. Pechacek TF.

Title

Exposure to secondhand smoke in the workplace: Serum cotinine by occupation

Source

Journal of Occupational & Environmental Medicine. 44(6):503-509, 2002 Jun.

Abstract

To examine workplace exposure to secondhand smoke by occupation, we analyzed data from The Third National Health and Nutrition Examination Survey (NHANES III) (1988 to 1994), a nationally representative sample of the noninstitutionalized population. The analysis was restricted to 4952 employed nonsmoking adults who reported no home exposure to cigarette smoke. Occupations were assigned to 40 groups and 7 categories. Among the categories, geometric mean serum cotinine (ng/mL) ranged from 0.09 for farming/forestry/fishing occupations to 0.22 for operators/fabricators/laborers (median, 0.16). The lowest values were observed among farmers and nursery workers (0.06) and the highest among waiters (0.47). Between 1988 to 1991 and 1991 to 1994, the overall geometric mean cotinine and the proportion reporting that they could smell smoke at work decreased significantly. In conclusion, workplace exposure to secondhand smoke varied by occupation, and decreases in exposure occurred between 1988 to 1991 and 1991 to 1994. [References: 30]

Publication Type

Article

<3>

Authors

Bates MN. Fawcett J. Dickson S. Berezowski R. Garrett N.

Title

Exposure of hospitality workers to environmental tobacco smoke

Source

Tobacco Control. 11(2):125-129, 2002 Jun.

Abstract

Objective: To determine quantitatively the extent of exposure of hospitality workers to environmental tobacco smoke (ETS) exposure during the course of a work shift, and to relate these results to the customer smoking policy of the workplace.

Subjects: Three categories of non-smoking workers were recruited: (1) staff from hospitality premises (bars and restaurants) that permitted smoking by customers; (2) staff from smokefree hospitality premises; and (3) government employees in smokefree workplaces. All participants met with a member of the study team before they began work, and again at the end of their shift or work day. At each meeting, participants answered questions from a standardised questionnaire and supplied a saliva sample.

Main outcome measures: Saliva samples were analysed for cotinine. The difference between the first and second saliva sample cotinine concentrations indicated the degree of exposure to ETS over the course of the work shift.

Results: Hospitality workers in premises allowing smoking by customers had significantly greater increases in cotinine than workers in smokefree premises. Workers in hospitality premises with no restrictions

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on customer smoking were more highly exposed to ETS than workers in premises permitting smoking only in designated areas.

Conclusions: Overall, there was a clear association between within-shift cotinine concentration change and smoking policy. Workers in premises permitting customer smoking reported a higher prevalence of respiratory and irritation symptoms than workers in smokefree workplaces. Concentrations of salivary cotinine found in exposed workers in this study have been associated with substantial involuntary risks for cancer and heart disease. [References: 17]

Publication Type

Article

<4>

Authors

Boffetta P.

Title

Involuntary smoking and lung cancer [Review]

Source

Scandinavian Journal of Work, Environment & Health. 28(Suppl 2):30-40, 2002.

Abstract

Involuntary smoking contains human carcinogens. Exposure prevalence among adults is on the order of 40%. A meta-analysis of epidemiologic studies on lung cancer and exposure to involuntary smoking from the spouse included 51 studies. The overall relative risk (RR), based on 7369 cases of lung cancer, was 1.25 [95% confidence interval (95% CI) 1.15-1.37]. No evidence existed of an RR difference between the two genders, and study design had no influence on the results. The summary RR was lower for adenocarcinoma than for other histological types. In the largest studies cumulative exposure suggested a dose-response relationship with a unit risk of similar magnitude. The summary RR was 1.17 (95% CI 1.04-1.32) for workplace exposure. Several sources of bias may lead to both overestimation and underestimation of true association, and the most plausible interpretation favors a causal association. Even if excess risk from exposure to involuntary smoking is small, its large prevalence makes it an important environmental carcinogen. [References: 107]

Publication Type

Review

<5>

Authors

Jousilahti P. Patja K. Salomaa V.

Title

Environmental tobacco smoke and the risk of cardiovascular disease

[Review]

Source

Scandinavian Journal of Work, Environment & Health. 28(Suppl 2):41-51, 2002.

Abstract

Disease risk due to smoking is not limited to smokers only. Passive smoking, exposure to environmental tobacco smoke, is associated with adverse health effects, and it increases the risk of several diseases. This paper summarizes the cardiovascular effects of tobacco smoke and

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the current data on the effects of environmental tobacco smoke on the development of cardiovascular disease. According to the results of epidemiologic and experimental studies, environmental tobacco smoke has marked harmful effects on the cardiovascular system. It is estimated that it increases the risk of an acute event of coronary heart disease by 25-35%. Even though the number of studies conducted in the work environment is small, there is no reason to assume that the cardiovascular effects of environmental tobacco smoke differ markedly between the home and the workplace. Firm and timely actions are needed to protect people from exposure to environmental tobacco smoke, both in occupational and other environments. [References: 112]

Publication Type

Review

<6>

Authors

Jaakkola MS. Jaakkola JJK.

Title

Effects of environmental tobacco smoke on the respiratory health of adults [Review]

Source

Scandinavian Journal of Work, Environment & Health. 28(Suppl 2):52-70, 2002.

Abstract

In this paper, current knowledge on the respiratory effects of environmental tobacco smoke among adults is synthesized, and the biological basis and methodological issues are discussed. The Medline database was searched from 1966 through October 2000. All of the related respiratory effects have been linked to both home and workplace exposures. Some evidence of a dose-response relation has also been detected for all respiratory conditions. The strongest evidence of a causal relation exists for chronic respiratory symptoms. Harmful effects on lung function have also been detected, mainly in countries and occupations with high exposure levels. There is limited evidence indicating an increased risk of its causing asthma and chronic obstructive pulmonary disease, and also for poor control of established asthma. More longitudinal studies with careful assessment of exposure are needed for better risk estimates. Despite these challenges for the future, the combination of toxicologic evidence, abundant evidence on respiratory effects among children, and the studies reviewed in this paper point to an urgent need for measures to prevent exposure to environmental tobacco smoke among adults. [References: 111]

Publication Type

Review

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Source: <https://www.industrydocuments.ucsf.edu/docs/jghj0001>

<7>

Authors

Brownson RC. Hopkins DP. Wakefield MA.

Title

Effects of smoking restrictions in the workplace [Review]

Source

Annual Review of Public Health. 23:333-348, 2002.

Abstract

The health hazards caused by exposure to environmental tobacco smoke (ETS) are well established. Workplace exposure to ETS is strongly influenced by the types of workplace and smoking policy-total bans on smoking have become common in many countries. Blue-collar and service workers are more likely than other types of workers to be exposed to ETS in the workplace. Smokers who are employed in workplaces with smoking bans are likely to consume fewer cigarettes per day, are more likely to be considering quitting, and quit at an increased rate compared with smokers employed in workplaces with no or weaker policies. Despite substantial progress in protecting workers from ETS, additional efforts are needed in areas that include attention to exposure among blue-collar and service workers; policies in workplaces with a limited number of employees; and studies of enforcement, effects on smoking cessation in multiple settings, and cost-effectiveness. [References: 62]

Publication Type

Review

<8>

Authors

Rohrbach LA. Howard-Pitney B. Unger JB. Dent CW. Howard KA. Cruz TB. Ribisl KM. Norman GJ... Fishbein H. Johnson CA.

Title

Independent evaluation of the California tobacco control program: Relationships between program exposure and outcomes, 1996-1998

Source

American Journal of Public Health. 92(6):975-983, 2002 Jun.

Abstract

Objectives. This study sought to determine the effects of the California Tobacco Control Program on tobacco-related attitudes and behaviors.

Methods. In 1996 and 1998, a telephone survey was conducted among adults in randomly selected households in 18 California counties. Tenth-grade youths in 84 randomly selected high schools completed a written survey. In analyses conducted at the county level, differences in outcomes were regressed on an index of program exposure.

Results. Among adults, program exposure was associated with decreased smoking prevalence rates, increased no-smoking policies in homes, and decreased violations of workplace no-smoking policies. Among youths, there was no effect of program exposure on outcomes.

Conclusions. These results suggest that the California Tobacco Control Program may have reduced adult smoking prevalence rates and exposure to environmental tobacco smoke. [References: 50]

Publication Type

Article

PM3006508980

<9>

Authors

Chriqui JF. Frosh M. Brownson RC. Shelton DM. Sciandra RC. Hobart R. Fisher PH. el Arculli R. Alciati MH.

Title

Application of a rating system to state clean indoor air laws (USA)

Source

Tobacco Control. 11(1):26-34, 2002 Mar.

Abstract

Objective: To develop and implement a system for rating state clean indoor air laws.

Design: The public health interest of state clean indoor air laws is to limit non-smoker exposure to environmental tobacco smoke (ETS). Current estimates of health risks and methods available for controlling ETS provided a framework for devising a ratings scale. An advisory committee applied this scale to each of seven site specific smoking restrictions and two enforcement related items. For each item, a target score of +4 was identified. The nine items were then combined to produce a summary score for each state. A state that achieved the target across all nine items would receive a summary score of 36 points and be eligible to receive an additional 6 points for exceeding the target on six of the nine items, resulting in a maximum summary score of 42 points. Individual scores were also adjusted to reflect state level preemption measures. Each state's law was evaluated annually from 1993 through 1999.

Setting: USA.

Main outcome measure: A summary score measuring the extensiveness of the state's clean indoor air law.

Results: State laws restricting smoking in the seven individual locations of interest were relatively weak. The overall mean score across the location restrictions ranged from 0.72 in 1993 to 0.98 in 1999. Mean scores were higher for the enforcement items than for the location restrictions. Summary scores ranged from 0 to 20 in 1993 and 0 to 31 in 1994 through 1999. Average summary scores ranged from 8.71 in 1993 to 10.98 in 1999. By the end of 1999, scores increased for 22 states; however between 1995 and 1997 there were no changes in the summary scores. Three states scored zero, points across all years. From 1993 through 1999, there was a 41% increase in the number of states that had in place state level preemption measures.

Conclusion: The number of newly enacted state clean indoor air laws has remained relatively stagnant since 1995. With a few exceptions, as of the end of 1999, progress in enacting state laws to meet specified public health targets for reducing exposure to ETS was relatively low. Thus, state laws in the USA provide, on average, only minimal protection in specified areas and, given the increase in preemption, are increasingly undermining those passed in localities. [References: 56]

Publication Type

Article

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Source: <https://www.industrydocuments.ucsf.edu/docs/jghj0001>

<10>

Authors

Stamatakis KA. Brownson RC. Luke DA.

Title

Risk factors for exposure to environmental tobacco smoke among ethnically diverse women in the United States

Source

Journal of Womens Health & Gender-Based Medicine. 11(1):45-51, 2002

Jan-Feb.

Abstract

The likelihood of exposure to environmental tobacco smoke (ETS) has been shown to vary across sociodemographic characteristics, health behaviors, and the type of smoking restrictions at work. Women may be particularly at risk. The purpose of our study was to assess differences in the likelihood of exposure to ETS at home and at work among an ethnically diverse sample of women age 40 and older in the United States. We used data from the U. S. Women's Determinants Study and restricted the sample to include only nonsmoking women (n = 2326). Unadjusted and adjusted odds ratios (aOR) for exposure to ETS by sociodemographic characteristics, health risk behaviors, and the type of workplace smoking policy were calculated using logistic regression. Exposure to ETS at home was associated with being American Indian/Alaska Native (aOR 1.5, 95% CI 1.0, 2.6), age 40-44 (aOR 1.6, 95% CI 1.0, 2.6) and 45-54 (aOR 1.8, 95% CI 1.2, 2.6), having eighth grade (aOR 2.1, 95% CI 1.3, 3.6) or high school education (aOR 2.2, 95% CI 1.4, 3.3), inadequate fruit and vegetable consumption (aOR 1.5, 95% CI 1.0, 2.1), and not getting screened for breast cancer (aOR 1.5, 95% CI 1.1, 2.0). Women who did not have regular breast (aOR 1.3, 95% CI 1.9, 1.9) and cervical (aOR 2.0, 95% CI 1.5, 5.3) cancer screening were more likely to be exposed to ETS at work. Exposure to ETS at work was higher among women with some high school education (aOR 2.8, 95% CI 1.5, 5.3) and high school graduates (aOR 3.1, 95% CI 1.9, 5.1) and substantially higher for women who worked where smoking was allowed in some (aOR 15.1, 95% CI 10.2, 22.4) or all (aOR 44.8, 95% CI 19.6, 102.4) work areas. Larger effect sizes were observed for the relationship between selected risk factors and ETS exposure at work than for ETS exposure at home. Among individual risk factors, lower education level was most strongly related to ETS exposure at work. The likelihood of being exposed to ETS at work was highest for women whose workplace smoking policies allowed smoking in some or all work areas. [References: 21]

Publication Type

Article

<11>

Authors

Schorp MK. Leyden DE.

Title

Distribution analysis of airborne nicotine concentrations in hospitality facilities

Source

Environment International. 27(7):567-578, 2002 Feb.

Abstract

A number of publications report statistical summaries for environmental tobacco smoke (ETS) concentrations. Despite compelling evidence for the data not being normally distributed, these publications typically report the arithmetic mean and standard deviation of the data, thereby losing important information related to the distribution of values contained in the original data. We were interested in the frequency distributions of reported nicotine concentrations in hospitality environments and subjected available data to distribution

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analyses. The distribution of experimental indoor airborne nicotine concentration data taken from hospitality facilities worldwide was fit to lognormal, Weibull, exponential, Pearson (Type V), logistic, and loglogistic distribution models. Comparison of goodness of fit (GOF) parameters and indications from the literature verified the selection of a lognormal distribution as the overall best model. When individual data were not reported in the literature, statistical summaries of results were used to model sets of lognormally distributed data that are intended to mimic the original data distribution. Grouping the data into various categories led to 31 frequency distributions that were further interpreted. The median values in nonsmoking environments are about half of the median values in smoking sections. When different continents are compared, Asian, European, and North American median values in restaurants are about a factor of three below levels encountered in other hospitality facilities. On a comparison of nicotine concentrations in North American smoking sections and nonsmoking sections, median values are about one-third of the European levels. The results obtained may be used to address issues related to exposure to ETS in the hospitality sector. (C) 2002 Elsevier Science Ltd. All rights reserved.

[References: 63]

Publication Type

Article

<12>

Authors

Jenkins RA. Finn D. Tomkins BA. Maskarinec MP.

Title

Environmental tobacco smoke in the nonsmoking section of a restaurant:

A case study

Source

Regulatory Toxicology & Pharmacology. 34(3):213-220, 2001 Dec.

Abstract

This study tested the concentrations of environmental tobacco smoke (ETS) components in a small restaurant/pub with smoking and nonsmoking areas- a facility outfitted with a heat-recovery ventilation system and directional airflow. The ETS levels in the nonsmoking area were compared with those in other similar restaurants/pubs where indoor smoking is altogether prohibited. The results indicate that ETS component concentrations in the nonsmoking section of the facility in question were not statistically different ( $P < 0.05$ ) from those measured in similar facilities where smoking is prohibited. The regulatory implications of these findings are that ventilation techniques for restaurants/pubs with separate smoking and nonsmoking areas are capable of achieving nonsmoking area ETS concentrations that are comparable to those of similar facilities that prohibit smoking outright. (C) 2001 Elsevier Science. [References: 14]

Publication Type

Article

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<13>

Authors

Burke JM. Zufall MJ. Ozkaynak H.

Title

A population exposure model for particulate matter: case study results for PM2.5 in Philadelphia, PA

Source

Journal of Exposure Analysis & Environmental Epidemiology. 11(6):470-489, 2001 Nov-Dec.

Abstract

A population exposure model for particulate matter (PM), called the Stochastic Human Exposure and Dose Simulation (SHEDS-PM) model, has been developed and applied in a case study of daily PM<sub>2.5</sub> exposures for the population living in Philadelphia, PA. SHEDS-PM is a probabilistic model that estimates the population distribution of total PM exposures by randomly sampling from various input distributions. A mass balance equation is used to calculate indoor PM concentrations for the residential microenvironment from ambient outdoor PM concentrations and physical factor data (e.g., air exchange, penetration, deposition), as well as emission strengths for indoor PM sources (e.g., smoking, cooking). PM concentrations in nonresidential microenvironments are calculated using equations developed from regression analysis of available indoor and outdoor measurement data for vehicles, offices, schools, stores, and restaurants/bars. Additional model inputs include demographic data for the population being modeled and human activity pattern data from EPA's Consolidated Human Activity Database (CHAD). Model outputs include distributions of daily total PM exposures in various microenvironments (indoors, in vehicles, outdoors), and the contribution from PM of ambient origin to daily total PM exposures in these microenvironments. SHEDS-PM has been applied to the population of Philadelphia using spatially and temporally interpolated ambient PM<sub>2.5</sub> measurements from 1992 - 1993 and 1990 US Census data for each census tract in Philadelphia. The resulting distributions showed substantial variability in daily total PM<sub>2.5</sub> exposures for the population of Philadelphia (median = 20  $\mu\text{g}/\text{m}^3$ ; 90th percentile = 59  $\mu\text{g}/\text{m}^3$ ). Variability in human activities, and the presence of indoor-residential sources in particular, contributed to the observed variability in total PM<sub>2.5</sub> exposures. The uncertainty in the estimated population distribution for total PM<sub>2.5</sub> exposures was highest at the upper end of the distribution and revealed the importance of including estimates of input uncertainty in population exposure models. The distributions of daily microenvironmental PM<sub>2.5</sub> exposures (exposures due to time spent in various microenvironments) indicated that indoor-residential PM<sub>2.5</sub> exposures (median = 13  $\mu\text{g}/\text{m}^3$ ) had the greatest influence on total PM<sub>2.5</sub> exposures compared to the other microenvironments. The distribution of daily exposures to PM<sub>2.5</sub> of ambient origin was less variable across the population than the distribution of daily total PM<sub>2.5</sub> exposures (median = 7  $\mu\text{g}/\text{m}^3$ ; 90th percentile = 18  $\mu\text{g}/\text{m}^3$ ) and similar to the distribution of ambient outdoor PM<sub>2.5</sub> concentrations. This result suggests that human activity patterns did not have as strong an influence on ambient PM<sub>2.5</sub> exposures as was observed for exposure to other PM<sub>2.5</sub> sources. For most of the simulated population, exposure to PM<sub>2.5</sub> of ambient origin contributed a significant percent of the daily total PM<sub>2.5</sub> exposures (median = 37.5%), especially for the segment of the population without exposure to environmental tobacco smoke in the residence (median = 46.4%). Development of the SHEDS-PM model using the Philadelphia PM<sub>2.5</sub> case study also provided useful insights into the limitations of currently available data for use in population exposure models. In addition, data needs for improving inputs to the SHEDS-PM

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model, reducing uncertainty and further refinement of the model structure, were identified. [References: 53]

Publication Type

Article

<14>

Authors

Bero LA. Montini T. Bryan-Jones K. Mangurian C.

Title

Science in regulatory policy making: case studies in the development of workplace smoking restrictions

Source

Tobacco Control. 10(4):329-336, 2001 Dec.

Abstract

Objective-To study the role of science related and other arguments in the development of workplace smoking regulations.

Design-Case study, content analysis Subjects-Written commentaries and hearing transcripts on proposed indoor air regulations in Maryland and Washington.

Main outcome measures-We coded each written commentary and hearing testimony for position toward the regulation, affiliation of the person submitting it, criteria used to evaluate science and scientific, ideological, economic, political, engineering and procedural arguments.

Results-In both states, opposition to the regulations came primarily from the tobacco industry, small businesses, and business organisations and appeared to be coordinated. There was little coordination of public health support for the regulations. Arguments about science were used more often by those opposed to the regulations than by those in favour. Supporters emphasised the quantity of the evidence, while opponents criticised its reliability, validity, and quality. Arguments not related to science (61% of total arguments; 459/751), were more common than scientific arguments (39% of total arguments; 292/751). Economic and ideological arguments were used to a similar extent by regulation supporters and opponents.

Conclusions-Advocates can support health related regulations by submitting commentary emphasising the sound research base for regulation and countering criticisms of research. National coordination of these efforts could avoid duplication of effort and make more efficient use of limited public health resources. [References: 55]

Publication Type

Article

<15>

Authors

Jenkins RA. Maskarinec MP. Counts RW. Caton JE. Tomkins BA.  
Ilgnner RH.

Title

Environmental tobacco smoke in an unrestricted smoking workplace: area and personal exposure monitoring

Source

Journal of Exposure Analysis & Environmental Epidemiology. 11(5):369-380, 2001 Sep-Oct.

Abstract

The objective of this investigation was to determine the extent of areal and day-to-day variability of stationary environmental tobacco

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Source: <https://www.industrydocuments.ucsf.edu/docs/jghj0001>

smoke (ETS) concentrations in a single large facility where smoking was both prevalent and unrestricted, and to determine the degree of daily variation in the personal exposure levels of ETS constituents in the same facility. The subject facility was a relatively new four-story office building with an approximate volume of 1.3 million ft. The exchange of outside air in the building was determined to be between 0.6 and 0.7 air changes per hour. Eighty-seven area samples (excluding background) were collected at 29 locations over the course of 6 days of sampling. Locations included offices and cubicles occupied by smokers and nonsmokers, common areas, and the computer and mail rooms. Twenty-four nonsmoking subjects wore personal sampling systems to collect breathing zone air samples on each of 3 days in succession. This generated a total of seventy-two 8-h time-weighted average (TWA) personal exposure samples. In all samples, respirable suspended particulate matter, ultraviolet light-absorbing and fluorescing particulate matter, solanesol, nicotine, and 3-ethenyl pyridine were determined. With the exception of a few locations, tobacco-specific airborne constituents were determined in all samples. Not surprisingly, areas with the highest ETS constituent concentrations were offices and cubicles of smokers. Median and 95th percentile concentrations for all area samples, excluding background, were determined to be 1.5 and 8.7  $\mu\text{g}/\text{m}^3$  for nicotine, and 8.2 and 59  $\mu\text{g}/\text{m}^3$  for ETS-specific particles (as solanesol-related particulate matter, Sol-PM), respectively. Personal exposure concentrations of ETS components were similar to those levels found in the area samples (median nicotine and Sol-PM concentrations were 1.24 and 7.1  $\mu\text{g}/\text{m}^3$ , respectively), but the range of concentrations was somewhat smaller. For example, the 95th percentile 8-h TWA nicotine and ETS-specific particle (as Sol-PM) concentrations were 3.58 and 21.9  $\mu\text{g}/\text{m}^3$ , respectively. Intrasubject variation of daily concentrations ranged from 20% to 60%, depending on the component. Self-reported proximity to smokers was supported by higher ETS concentrations determined from the personal monitors, but only to a modest extent. Although smoking was completely unrestricted inside the main office areas of the facility, ETS levels, either areal or from personal exposure measurements, were lower than those estimated by Occupational Safety and Health Administration to be present in such facilities. [References: 36]

Publication Type

Article

<16>

Authors

Longo DR. Johnson JC. Kruse RL. Brownson RC. Hewett JE.

Title

A prospective investigation of the impact of smoking bans on tobacco cessation and relapse

Source

Tobacco Control. 10(3):267-272, 2001 Sep.

Abstract

Background and objectives-To examine the long term impact of workplace smoking bans on employee smoking cessation and relapse. Over three years we studied a total of 1033 current or former smokers (intervention group) employed in smoke-free hospitals and 816 current or former smokers (comparison group) employed in non-smoke-free workplaces. The design of this natural experiment is a prospective cohort study. We randomly selected both hospitals and employees from 12 strata based on hospital size and state tobacco regulations, and sampled employees in the same communities. Main outcome measures were post-ban quit ratio and relapse rate.

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Research design-Between groups comparisons were conducted using the Cochran-Mantel-Haenszel statistic for general association, stratified Cox proportional hazards models, and the CMH analysis of variance statistic based on ranks. McNemar's test and the sign test were used to test for changes over time within each group.

Results-Differences in the post-ban quit ratio were observed between intervention and comparison groups ( $p$  less than or equal to 0.02). For employees whose bans were implemented at least seven years before survey, the post-ban quit ratio was estimated at 0.256, compared with 0.142 for employees in non-smoke-free workplaces ( $p = 0.02$ ). After controlling for a variety of factors, time to quit smoking was shorter for the hospital employees ( $p < 0.001$ ), with an overall relative risk of quitting of 2.3. Contrary to expectations, relapse rates were similar between the groups.

Conclusion-Employees in workplaces with smoking bans have higher rates of smoking cessation than employees where smoking is permitted, but relapse is similar between these two groups of employees. The results of this investigation have international applicability for policy makers, clinicians, employers, and employees. Countries should review smoking policies in workplaces in light of their own smoking patterns and efforts to deal with environmental tobacco smoke. [References: 41]

Publication Type

Article

<17>

Authors

Eisner MD. Katz PP. Yelin EH. Hammond SK. Blanc PD.

Title

Measurement of environmental tobacco smoke exposure among adults with asthma

Source

Environmental Health Perspectives. 109(8):809-814, 2001 Aug.

Abstract

Because the morbidity and mortality from adult asthma have been increasing, the identification of modifiable environmental exposures that exacerbate asthma has become a priority. Limited evidence suggests that exposure to environmental tobacco smoke (ETS) may adversely affect adults with asthma. To study the effects of ETS better, we developed a survey instrument to measure ETS exposure in a cohort of adults with asthma living in northern California, where public indoor smoking is limited. To validate this survey instrument, we used a passive badge monitor that measures actual exposure to ambient nicotine, a direct and specific measure of ETS. In this validation study, we recruited 50 subjects from an ongoing longitudinal asthma cohort study who had a positive screening question for ETS exposure or potential exposure. Each subject wore a passive nicotine badge monitor for 7 days. After the personal monitoring period, we readministered the ETS exposure survey instrument. Based on the survey, self-reported total ETS exposure duration ranged from 0 to 70 hr during the previous 7 days. Based on the upper-range boundary, bars or nightclubs (55 hr) and the home (50 hr) were the sites associated with greatest maximal self-reported exposure. As measured by the personal nicotine badge monitors, the overall median 7-day nicotine concentration was 0.03  $\mu\text{g}/\text{m}^3$  (25th-75th interquartile range 0-3.69  $\mu\text{g}/\text{m}^3$ ). Measured nicotine concentrations were highest among persons who reported home exposure (median 0.61  $\mu\text{g}/\text{m}^3$ ), followed by work exposure (0.03  $\mu\text{g}/\text{m}^3$ ), other (outdoor) exposure (0.025  $\mu\text{g}/\text{m}^3$ ), and no exposure (0  $\mu\text{g}/\text{m}^3$ ;  $p = 0.03$ ). The Spearman rank correlation coefficient between self-reported ETS exposure duration

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Source: <https://www.industrydocuments.ucsf.edu/docs/jghj0001>

and directly measured personal nicotine concentration during the same 7-day period was 0.47, supporting the survey's validity ( $p = 0.0006$ ). Compared to persons with no measured exposure, lower-level [odds ratio (OR) 1.9; 95% confidence interval (CI), 0.4-8.8] and higher-level ETS exposures (OR 6.8; 95% CI, 1.4-32.3) were associated with increased risk of respiratory symptoms. A brief, validated survey instrument can be used to assess ETS exposure among adults with asthma, even with low levels of exposure. This instrument could be a valuable tool for studying the effect of ETS exposure on adult asthma health outcomes.

[References: 35]

Publication Type

Article

<18>

Authors

Smith CJ. Bombick DW. Ryan BA. Morton MJ. Doolittle DJ.

Title

Pulmonary function in nonsmokers following exposure to sidestream cigarette smoke

Source

Toxicologic Pathology. 29(2):260-264, 2001 Mar-Apr.

Abstract

Ten healthy male and 10 healthy female, "never-smoking" subjects (ages 21-50) participated in a 5-day environmental room study to determine if an acute exposure to a high level of fresh diluted sidestream smoke (FDSS) would alter pulmonary function. On Monday, Tuesday, Thursday and Friday, the twenty subjects sat in an environmental room for 7.33 hours and were exposed to filtered and humidified air. On Wednesday, the twenty subjects were exposed in an environmental room for 7.33 hours to an average respirable suspended particle (RSP) concentration of 179 micrograms per m<sup>3</sup> of FDSS generated by machine smoking Kentucky 1R4F reference cigarettes. This level of FDSS is 3.3 times the 95th percentile concentration of workplace environmental tobacco smoke exposure levels previously measured in the US. FVC and FEV1 decreased approximately 1.6% ( $p < 0.05$ ) in both males and females after exposure. Similarly, PEF decreased approximately 1.3% ( $p < 0.03$ ) following exposure. The observed decrease in pulmonary function was consistent with a "stress" related norepinephrine-induced alteration in blood flow leading to transient bronchoconstriction. Alternatively, a cholinergic reflex due to activation of bronchopulmonary C fibers may have also played a role in the transient bronchoconstriction. These small exposure-related decrements in pulmonary function were reversible.

[References: 29]

Publication Type

Article

<19>

Authors

Heloma A. Jaakkola MS. Kahkonen E. Reijula K.

Title

The short-term impact of national smoke-free workplace legislation on passive smoking and tobacco use

Source

American Journal of Public Health. 91(9):1416-1418, 2001 Sep.

Abstract

Objectives, This study sought to evaluate the short-term impact of national smoke-free workplace legislation on employee exposure to environmental tobacco smoke at work and on employee smoking habits.

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Source: <https://www.industrydocuments.ucsf.edu/docs/jghj0001>

Methods, We performed 2 cross-sectional studies in 9 medium-sized and large Finnish workplaces, before and after implementation of national smoke-free workplace legislation. We assessed tobacco smoke exposure via questionnaire and indoor air-nicotine measurements.

Results. Exposure to environmental tobacco smoke declined considerably after the legislation was implemented. Tobacco consumption among smokers diminished, Nicotine concentrations fell significantly.

Conclusions. Legislation was more efficient than voluntary workplace-specific smoking restrictions in reducing passive smoking and cigarette consumption. [References: 17]

Publication Type

Article

<20>

Authors

Shopland DR. Gerlach KK. Burns DM. Hartman AM. Gibson JT.

Title

State-specific trends in smoke-free workplace policy coverage: The Current Population Survey Tobacco Use Supplement, 1993 to 1999

Source

Journal of Occupational & Environmental Medicine. 43(8):680-686, 2001

Aug.

Abstract

We examined trends in smoke-free workplace policies among all indoor workers in the United States using the National Cancer Institute's Tobacco Use Supplement to the Census Bureau's Current, free was defined as Population Survey (total n = 270,063). Smoke-free was defined as not permitted in public or common areas or in work areas of a worksite. Nationally, we found that nearly 70% of the US workforce worked under a smoke-free policy in 1999. At the state level, a greater than 30-percentage-point differential existed in the proportion of workers with such policies. Although significant progress has been made to reduce worker exposure to environmental tobacco smoke on the job, we predict further progress may be difficult unless comprehensive regulations to protect all workers are implemented at the national, state, or local level. [References: 27]

Publication Type

Article

<21>

Authors

Kim YM. Harrad S. Harrison RM.

Title

Concentrations and sources of VOCs in urban domestic and public microenvironments

Source

Environmental Science & Technology. 35(6):997-1004, 2001 Mar 15.

Abstract

Concentrations of 15 VOCs, including 1,3-butadiene, benzene, and styrene were measured in a wide range of urban microenvironments, viz: homes, offices, restaurants, pubs, department stores, coach and train stations, cinemas, libraries, laboratories, perfume shops, heavily trafficked roadside locations, buses, trains, and automobiles. For most target VOCs-including 1,3-butadiene and benzene-mean concentrations at heavily trafficked roadside locations were exceeded by those in automobiles and were comparable to those in pubs and train stations. With regard to indoor-outdoor relationships in homes, this study

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revealed higher mean indoor concentrations, no correlation between simultaneously measured indoor and outdoor concentrations, and significantly different patterns of diurnal variation. Thus-in poorly ventilated buildings-indoor emission source strength is considered a more significant influence on-VOC concentrations than infiltration of outdoor air. In the six smoking homes studied, environmental tobacco smoke (ETS) was found to make a substantial contribution to concentrations of 1,3-butadiene. This finding was based on the significantly higher concentrations detected in smoking compared to nonsmoking homes, the significant correlation between 1,3-butadiene concentrations and those of 3-ethenylpyridine (an ETS marker), factor analysis, and the results of a source apportionment exercise based on ratios of 1,3-butadiene to 3-ethenylpyridine. [References: 21]

Publication Type

Article

<22>

Authors

Kottke TE. Aase LA. Brandel CL. Brekke MJ. Brekke LN. DeBoer SW. Hayes SN. Hoffman RS. Menzel PA. Thomas RJ.

Title

Attitudes of Olmsted County, Minnesota, residents about tobacco smoke in restaurants and bars

Source

Mayo Clinic Proceedings. 76(2):134-137, 2001 Feb.

Abstract

Objective: To determine the attitudes of Olmsted County, Minnesota, adults about environmental tobacco smoke in restaurants, bars, and nightclubs.

Subjects and Methods: In this population survey, 2014 adults were contacted by random digit dial methods between February 28 and May 5, 2000, and asked to participate in a telephone survey; 1224 (61%) consented.

Results: For the 57% (95% confidence interval [CI], 54%-60%) of the study population that reported exposure to environmental tobacco smoke, the most frequently reported sites of exposure were restaurants (44% [95% CI, 41%-48%]), work (21% [95% CI, 18%-24%]), and bars (19% [95% CI, 16%-22%]). Seventy-two percent (95% CI, 69%-74%) of respondents said that they would select a smoke-free restaurant over one where smoking is permitted, and 70% (95% CI, 67% -72%) said that they would select a smoke-free bar over one where smoking is permitted. The majority of respondents said that they would not dine out or visit bars or nightclubs more often or less often if all restaurants, bars, and nightclubs were smoke-free.

Conclusions: Olmsted County residents prefer smoke-free restaurants, bars, and nightclubs. [References: 15]

Publication Type

Article

PM3006508990

<23>

Authors

Mannino DM. Moorman JE. Kingsley B. Rose D. Repace J.

Title

Health effects related to environmental tobacco smoke exposure in children in the United States - Data from the Third National Health and Nutrition Examination Survey

Source

Archives of Pediatrics & Adolescent Medicine: 155(1):36-41, 2001 Jan.

Abstract

Objective: To determine the effects of prenatal and postnatal smoke exposure on the respiratory health of children in the United States.

Design: Nationally representative cross-sectional survey, including questionnaire information, measurements of serum cotinine (a metabolite of nicotine), and pulmonary function measurement, of 5400 US children.

Setting and Participants: Children aged 4 to 16 years in the Third National Health and Nutrition Examination Survey, October 25, 1988, to October 15, 1994.

Methods: We stratified the study participants into tertiles, on the basis of serum cotinine levels, and used logistic and linear regression modeling, adjusting for known covariates, to determine the effect of high environmental tobacco smoke (ETS) exposure (on the basis of a high cotinine level) on outcomes such as the prevalence of current asthma, the prevalence of frequent wheezing, school absence, and lung function. For children aged 4 to 11 years, we also determined the effect of prenatal maternal smoking on these outcomes.

Results: We observed effects of ETS exposure in all age groups, although the effects varied between age groups. Among all children significant effects associated with high cotinine levels were for wheezing apart from cold in the past year (odds ratio [OR], 1.8; 95% confidence interval [CI], 1.1-2.8); 6 or more days of school absence in the past year (OR, 2.0; 95% CI, 1.4-2.8); and lung function decrements in the forced expiratory volume in 1 second (mean change, -1.8%; 95% CI, -3.2% to -0.4%) and the maximal midexpiratory flow (mean change, -5.9%; 95% CI, -8.1% to -3.4%). Although current and ever asthma were not significantly associated with high cotinine levels in the overall group (OR, 1.5; 95% CI, 0.8-2.7, and OR, 1.3; 95% CI, 0.8-2.2, respectively), they were increased significantly among 4- to 6-year-old children (OR, 5.3; 95% CI, 2.2-12.7, and OR, 2.3; 95% CI, 1.1-5.1, respectively).

Conclusions: We investigated recent ETS exposures as important predictors of respiratory health outcomes in children 4 years and older. Environmental tobacco smoke exposure affects children of all ages, although the exact effects may vary between age groups. [References: 22]

Publication Type

Article

PM3006508991

Source: <https://www.industrydocuments.ucsf.edu/docs/jghj0001>